ITEM 110 FY93
04DS31
31 May 1991

PURCHASE DESCRIPTION

OPTICAL TIME DOMAIN REFLECTOMETER (OTDR)

TDFAA-C

1.0 GENERAL This procurement requires a portable, general purpose, solid state, programmable optical time domain reflectometer (OTDR) capable of measuring faults and splices in multimode optical fiber cables at wavelengths of 1300 nanometers (nm). The OTDR shall be capable of performing calibrated optical attenuation and distance measurements.

2.0 CLASSIFICATION The equipment shall meet the requirements of MIL-T-28800( ), Type III, Class 5, Style E, Color R for Navy shipboard, submarine and shore applications with the following modifications and exceptions:

a. The non-operating temperature requirement is limited to the range of -40˚C to +65˚C.

b. The operating temperature requirement is limited to the range of 0˚C to +40˚C.

c. The Electromagnetic Interference requirements of MIL-T-28800D are limited to CE01 (-20 dB), CE03, CS01, CS02 (0.05 to 100 MHz), CS06, RE01 (back panel search excluded), RE02 (14 kHz to 10 GHz), and RS03.

3.0 OPERATIONAL REQUIREMENTS The equipment shall be capable of making measurements within the parameters and accuracies specified herein.

3.1 Light Source

3.1.1 Dual Wavelengths: 1300/1550 nm ±30 nm in single plug-in

3.1.2 Plug-In Module: Light source shall be interchangeable as plug-in module without need to disassemble mainframe.

3.1.3 Connector: ST type

3.1.4 Pulse Widths: At least 3
3.1.4.1 Minimum PW: 3 nsec or less

3.1.5 Pulse Recovery Time (Dead Zone): 10 m maximum

3.2 Vertical Axis: Attenuation/Loss Parameters

3.2.1 Scale Factor
3.2.1.1 Minimum: 0.5 dB/div or less
3.2.1.2 Maximum: 4.0 dB/div or more

3.2.2 Dynamic Range: 10 dB

3.2.3 Resolution: 0.02 dB or better

3.2.4 Measurement Modes:
Loss between 2 points
Loss by least squares approximation
Loss per unit length

3.3 Horizontal Axis: Distance Measurement

3.3.1 Range: At least 15 / 40 km

3.3.2 Accuracy: $\pm$[1.0 m + $2 \times 10^{-5} \times D$] [D = measured distance in meters]

3.3.3 Marker Resolution: FS/500[FS = full scale distance in meters]

3.3.4 Index of Refraction

3.3.4.1 Range: 1.4000 to 1.6000
3.3.4.2 Resolution: 0.0001

3.4. Signal Averaging Noise reduction shall be provided by sequential averaging of fiber signature trace. Parameters of 3.2 and 3.3 shall be achieved within two minutes of signal averaging.

3.5 Display. OTDR shall present the data from measurements in a graphical and alphanumeric form simultaneously.

3.5.1 Graphical: CRT visual observation of fiber characteristic in dB on the vertical axis versus fiber distance in meters on the horizontal axis. Trace shall show entire characteristic or a magnified portion of range.

3.5.2 Alphanumeric: Integral part of graphical display. The following parameters shall be displayed:

(1) Date
(2) Title (manual entry)
(3) Distance Range
(4) Horizontal Scale (m/div)
(5) Vertical Scale (dB/div)
(6) Horizontal Trace Start Distance
(7) Wavelength
(8) Marker Distance
(9) Pulse Width
(10) Index of Refraction
(11) Distance between Markers (m/km)
(12) Splice Loss (dB)
(13) Loss between Markers (dB)
(14) Fiber Loss (dB/km)

Note: Alphanumeric data must appear with data recalled from storage.

3.5.2.2 Markers/Cursors: At least two movable on-screen indicators, capable of being positioned at any point on graphical trace with resolution of 1.0 m

3.5.2.3 Loss Measurement
3.5.2.3.1 2 point: Loss in dB between any two points (markers)
3.5.2.3.2 Slope: Fiber loss per unit distance (dB/km)

3.5.2.4 Averaging Status Indicator: Indicator shall provide current status of signal averaging.

3.5.3 Hardcopy Printout: A hard copy duplicate of the complete CRT data screen shall be available from an internal printer/plotter.

4.0 GENERAL REQUIREMENTS

4.1 Power Source: 115 and 230 Vac ±10%, single phase, at frequencies of 50 and 60 Hz ±10%; and 400 Hz ±10% at 115 Vac only, 250 watts maximum

4.2 Dimensions: Portable less than 200 mm (H); 350 mm (W); 450 mm (D)

4.3 Weight: The overall weight of the unit with one plug-in shall not exceed 20 kg (44 lb).

4.4 Calibration Interval: The calibration interval shall be 12 months minimum. The equipment shall be within all accuracy requirements specified herein, with a 72% or greater confidence factor following a calibration interval of 12 months.

4.5 Remote Operation: The unit will be capable of remote operation via IEEE-488( ) bus interface. It shall operate as a talker or listener such that all functions except the power on/off switch are controllable and shall have as a minimum the following subset of GPIB commands: AH1, SH1, T6, L4, SR1, RL1, DC1, DT1.